NOTES ON THE TAXONOMY OF THE MEDITERRANEAN TRACHINIDAE (PISCES, OSTEICHTHYES)

by

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ABSTRACT.– All the four European species of Trachinidae have been traditionally included in the genus *Trachinus* L. (type *T. draco* L.). However, Bleeker (1861) established the genera *Echiichthys* (type *T. vipera* Cuv.) and *Pseudotrachinus* (type *T. radiatus* Cuv.). The former of these has been recently revived. The present study confirms that *E. vipera* is well distinct for a number of external and anatomical features. On the contrary, *Pseudotrachinus* is to be retained as a synonym of *Trachinus* because it is impossible to separate *T. radiatus, araneus* and *draco* at a generic level.

RESUME.– Les quatre espèces européennes de Trachinidae ont été toutes, par tradition, comprises dans le genre *Trachinus* L. (type *T. draco* L.). Toutefois, Bleeker (1861) a séparé les genres *Echiichthys* (type *T. vipera* Cuv.) et *Pseudotrachinus* (type *T. radiatus* Cuv.). Le premier de ceux-ci a été rétabli récemment. La présente étude confirme sa réelle validité, car *E. vipera* est bien isolé par une série de particularités externes et anatomiques. Au contraire, *Pseudotrachinus* doit être retenu comme un synonyme de *Trachinus* car d'après les caractères indiqués il est impossible de séparer *T. radiatus, araneus* et *draco* au niveau générique.

RIASSUNTO.– Le quattro specie europee di Trachinidae sono state tutte tradizionalmente incluse nel genere *Trachinus* L. (tipo *T. draco* L.). Tuttavia, Bleeker (1861) stabili i generi *Echiichthys* (tipo *T. vipera* Cuv.) e *Pseudotrachinus* (tipo *T. radiatus* Cuv.). Il primo di questi é stato convalidato di recente. Il presente studio conferma la sua reale validità, poiché *E. vipera* é ben isolato per una serie di particolarità esterne ed anatomiche. Al contrario, *Pseudotrachinus* deve rimanere come sinonimo di *Trachinus* perché in base ai suoi presunti caratteri non é possibile separare *T. radiatus, araneus* e *draco* a livello generico.

The Trachinidae family consists of a few species of littoral and strictly benthic marine fishes. They are well known for their poison glands which are connected to the strong spines of the opercles and the first dorsal fin. The four species that exist in the Mediterranean share the same essential features as far ecology is concerned. Whereas their geographical distribution differs remarkably : two *(Trachinus draco, Echiichthys vipera)* reach the northern seas of Europe, while another two *(Trachinus araneus, Trachinus radiatus)* are found in warmer waters along the coasts of west Africa.

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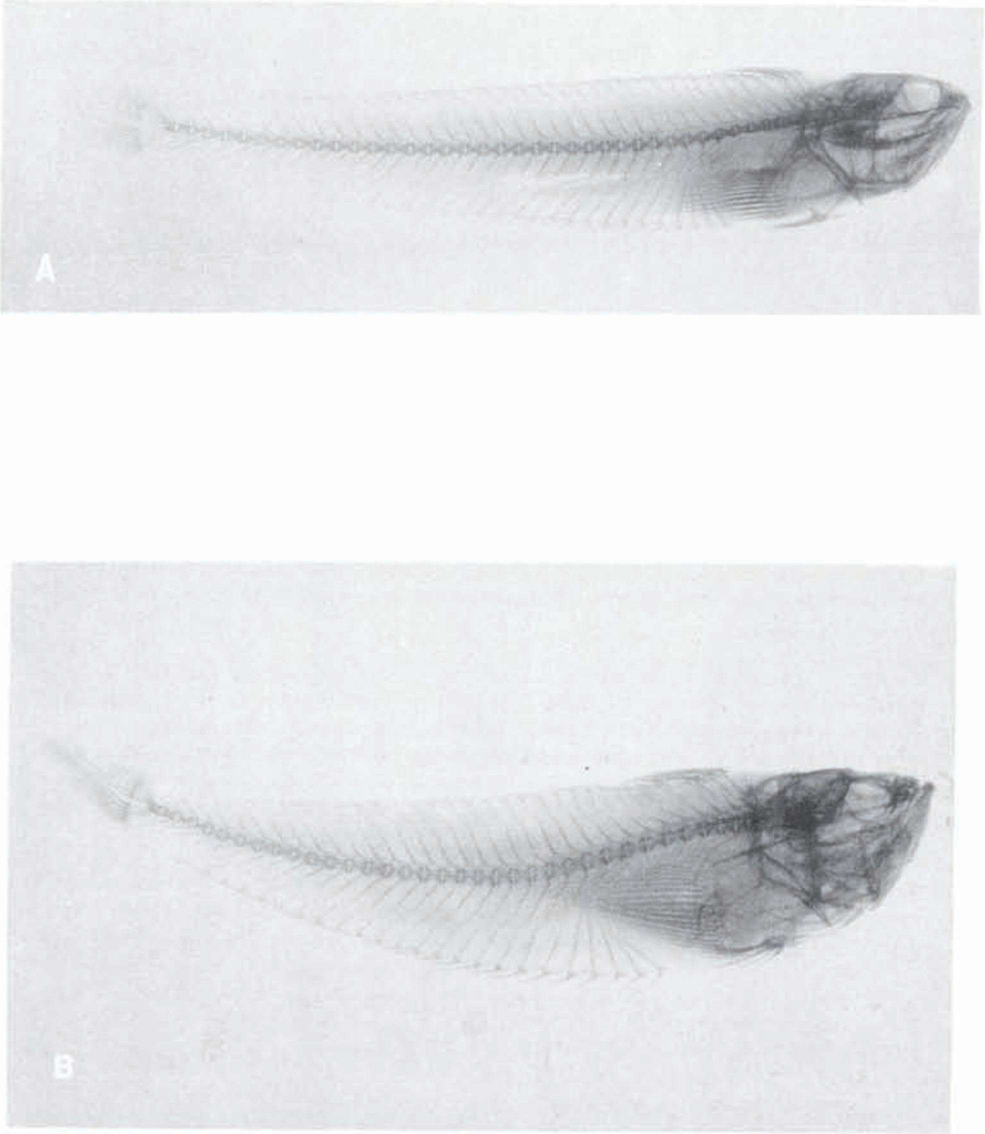

Fig. 1.– A. *T. draco.* (1/2 x). B.*E. vipera.* (1 x).

Until recently, all these fishes were referred to the genus *Trachinus* Linnaeus, 1758, of which *T. draco* L. is the typical species and one of the commonest.

The other Mediterranean Trachinidae were held to be congeneric with *T. draco* despite a number of different characters. Long ago, P. Bleeker (1861) studied these fishes in a paper that has unfortunately been neglected by ichthyologists. Bleeker referred to the four species mentioned above to three genera : *Trachinus (T. draco, T. araneus), Pseudotrachinus (T. radiatus)* and *Echiichthys (T. vipera).* The last two were proposed as new. A careful examination of these fishes casts doubts on the traditional taxonomy : a series of morphological features appears to indicate that more than one genus is involved.

In this note we consider the problem, in the light of Bleeker's views and of subsequent research on Trachinidae.

All the four Mediterranean species have been studied. Both fresh (from the Bay of Naples and from the Adriatic Sea) and preserved (Zoological Station of Naples, Museum National d'Histoire Naturelle de Paris) material has been employed. Particular attention has been paid to osteological characters (skull, urophore complex), using also X-rays (Fig. 1 A-B).

A brief definition of the Trachinidae follows.

Body rather elongated and compressed. Snout short. Mouth large and oblique ; premaxillaries protractile ; lower jaw prominent ; teeth small and acute, present on the premaxillaries, dentals, palatines and vomer. Eyes in upper position ; interorbital narrow and concave. Opercles with a strong horizontal spine connected to a poison gland. Six branchiostegal rays, membranes free from the isthmus. Pseudo branchiae present. Scales small and cycloid, arranged in oblique rows. Lateral line almost straight. Two dorsal fins, the first composed of spiny rays ; the second much longer and composed of numerous soft rays. Caudal fin with slightly concave or straight edge ; anal fin long and similar to the second dorsal fin ; pectoral fins inserted more anteriorly in their lower part ; pelvic fins jugular with one spiny and five soft rays. 34-43 vertebrae. No gas bladder. Six pyloric caeca.

As mentioned above, *T. draco* L. is the type species (by monotypy) of the genus *Trachinus*. Like the other Mediterranean species now referred to *Trachinus, T. draco* L. has two small spines on the upper anterior border of the orbit, a small group of scales on the cheeks, more than 70 scales on the lateral line, pectoral fins trapezoid with the posterior edge slightly concave. In order to consider the two genera of Trachinidae proposed by Bleeker, a few data concerning the dentition and the skeleton are necessary. The teeth are small and slightly recurved towards on the inner side. On both jaws they are arranged in four rows anteriorly, reduced to three and then to only two. The posterior teeth are smaller and more irregularly arranged. Only the anterior part (head) of the vomer bears teeth, forming an angular band with the point forwards : 2-3 series are recognizable. These teeth, and even more so those on the palatines, are smaller than those on the jaws (fig. 3A).

The skeleton of *T. draco* was described by Gunther (1860), and the skull by Gregory (1951, 1959).

Preorbital region short ; dorsal postorbital region (frontal and parietal bones) quadrangular ; occipital ridge absent ; interorbital concave ; parasphenoid narrow ; premaxillae thin and slightly shorter than the maxillae whose posterior edge is straight ; posterior processes of the premaxillary retract into double depressions which extend to the border of the anterior orbital. Suborbital series considerably restricted forwards ; preopercle with three spines on its lower edge, the posterior one longer and more acute (fig. 2A).

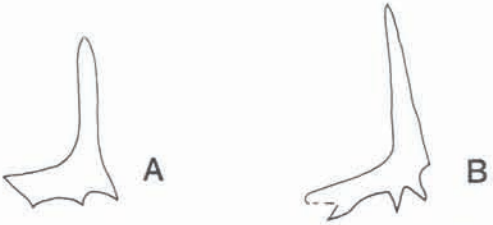

Fig. 2.– A. Preopercle of *T. draco*. (Schematic drawing). B. Preopercle of *E. vipera*. (Schematic drawing - not to scale).

In this context, it is interesting to add some data on the caudal skeleton (urophore complex), which varies considerably in different families of fishes (Monod, 1968). In Trachinidae it consists essentially of four hypural bones : the lower two are united and a marked groove separates them from the upper two. The latter are equal and a clear suture is evident between them. Above the hypurals are some epiural bones. Below, there is a parahypural bone with a short, spiniform process bent backwards (fig. 4A).

Let us now examine in greater detail the generic position of the four Mediterranean species of Trachinidae. In the more recent literature (Wheeler, 1973, 1978 ; Tortonese, 1975 ; Bauchot and Pras, 1980), three of them are included in the genus *Trachinus* : *T. draco* L., *T. araneus* Cuv., *T. radiatus* Cuv. and one is distinct : *Echiichthys vipera* (Cuv.). Therefore, only the genus *Echiichthys* is accepted as valid. Its original definition by Bleeker is as follows :

> "Caput vertice non granosum. Orbita ubique laevis. Maxilla superior usque ante oculum adscendens. Spinae suborbitales nullae. Squamae genis parcae, deciduae. Labia papillata vel fimbriata. Dentes pterygoidei nulli. Oculi obliqui subhorizontales. Praeoperculum aculeatum. Linea lateralis duplex."

The present study fully supports the validity of this monotypic genus. *E. vipera* is an easily identifiable fish. Its body is shorter than that of the other Trachinidae considered here : its maximum height is between 0.23 ± 0.02 (about 1/4) of the standard length, head 0,33 ± 0,02 (1/3). Other external features are : no preorbital

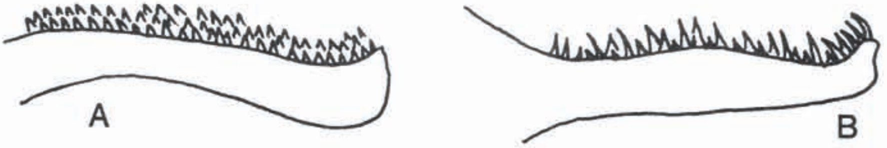

Fig. 3.– A. Dentary of *T. draco*. (Schematic drawing). B. Dentary of the *E. vipera*. (Schematic drawing).

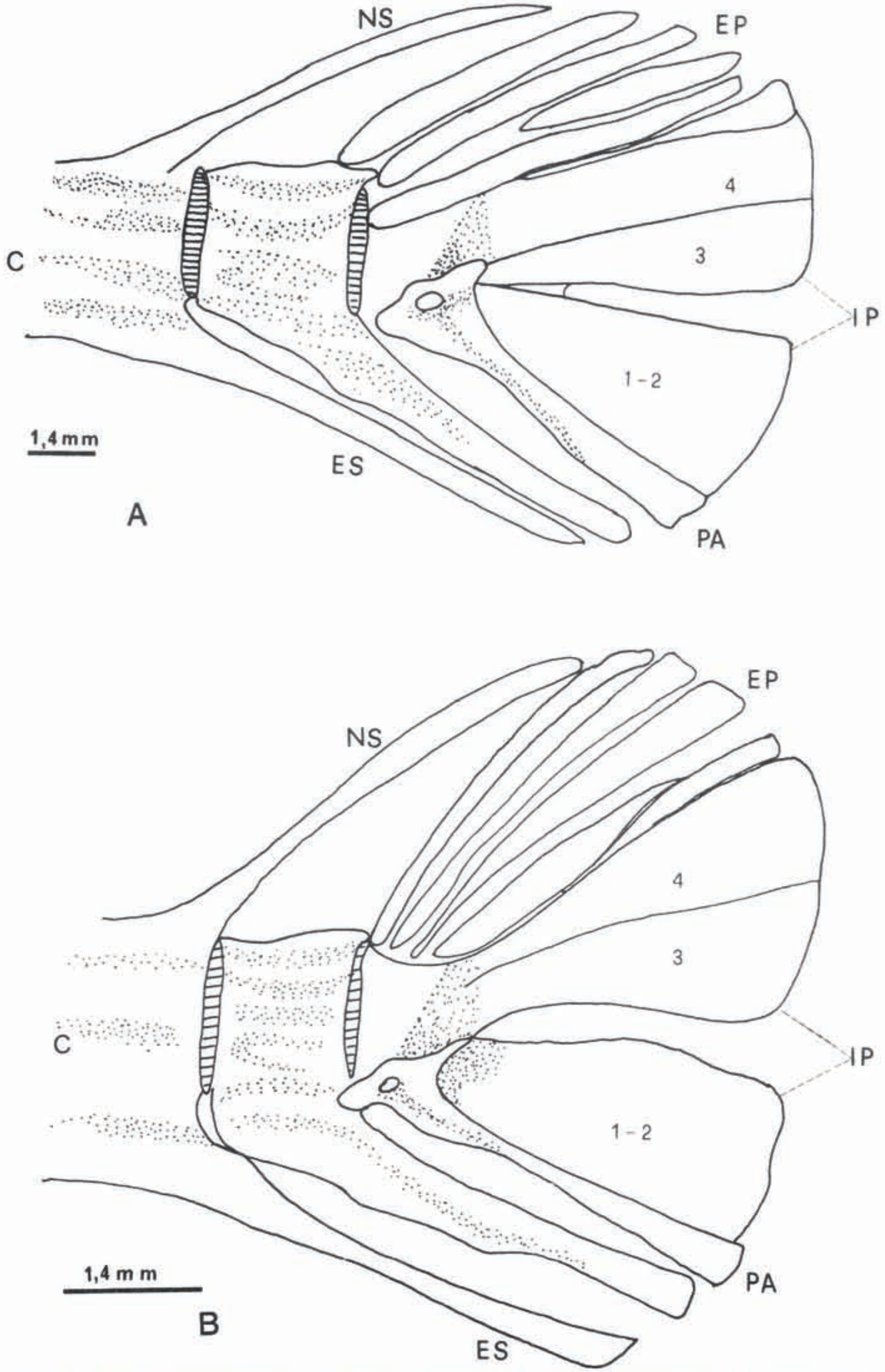

Fig. 4.– A. Urophore complex of *T. draco*. (Original). B. Urophore complex of *E. vipera*. (Original). Abbreviations : IP hypurals. PA parhypurals. EP epiurals. NS neurospine. ES hematospine. C centre of the vertebra.

spines, no scales on the cheeks, lip franged, about 60 scales on the lateral line (single !), pectoral fins rounded, caudal fin posteriorly almost straight.

The colour is brown-yellow with darker spots arranged alongside to form, more or less evident, longitudinal lines ; first dorsal black, caudal black on its posterior part (1/3-1/4). Maximum length 14 cm. Important characters are observed in the dentition and the skeleton. Regarding the teeth, there are two major differences between the genus *Echiichthys* and the trachinids. Firstly, both jaws, the teeth premaxillaries and dentals are unequal, the larger being caniniform. They are arranged in three series anteriorly, and two series posteriorly ; the innermost are always larger and caniniform. The second important difference to *Trachinus* is observed in the vomerine teeth, grouped in an oval area (Fig. 3B).

The most relevant features in the skull are : upper profile straight. Upper margin of the preorbital devoid of spines. Upper jaw with its apex around the level of the center of the eye. Lower jaw well prominent, with a large symphysial tubercle. Preopercular lower edge with three sharp spines : the first directed forward, the middle vertical and the third slightly backward. This is the general situation concerning the spines although variations sometimes occur (fig. 2B). As far the other parts of the skeleton are concerned, the vertebrae are less numerous than in *Trachinus* (34, and rarely 35) and in the urophore complex there is a deeper slit between the two groups of hypurals (fig. 4B).

The other genus proposed by Bleeker is *Pseudotrachinus,* (type-species : *T. radiatus* Cuv., 1829 of which *P. pardalis* Bleeker, 1861 is a synonym). Its definition is as follow :

> "Caput vertice granulis e centris radiantibus scabrum. Orbita antice spinis armata. Maxilla superior non usque ante oculum adscendens. Spinae suborbitales sursum spectantes. Squamae genis sessiles multiseriatae. Labia simplicia nec fimbriata nec papillata. Dentes pterygoidei nulli. Oculi obliqui subverticales. Praeoperculum non aculeatum. Linea lateralis simplex."

Only three of these features appear to separate this genus from *Trachinus* as described by Bleeker : 1) extremity of the upper jaw below the level of the eye ; 2) absence of pterygoid teeth ; 3) absence of spines on the lower part of the preopercle.

Comparing the three Mediterranean species (*E. vipera* is, of course, excluded) we find that the extremity of the upper jaw stands approximatly in front of the middle of the eye in *T. draco,* in front of its lower edge in *T. araneus,* and below it in *T. radiatus.* It may be observed that often the head of preserved specimens is somewhat distorted, which explains some variations in the figure. The group of pterygoid teeth is well apparent in *T. draco,* small in *T. araneus,* absent in *T. radiatus.*

A transition of characters is evident in this complex. The rugosities of the upper surface of the head are well developed in *T. radiatus* as they also are in *T. araneus*. The latter differs from the former for its lower lacrymal bone (about half the vertical diameter of the eye), the wider interorbital (greater than that diameter), and for the much more developed, pointed preopercular spines. As a whole, *T. araneus* can be interpreted as intermediate between *T. draco* and *T. radiatus*. Two conclusions may be drawn : a) *Pseudotrachinus* is a synonym of *Trachinus* ; b) the Mediterranean species refer to two genera only : *Trachinus* and *Echiichthys.*

It remains an open question whether all the species known in the Eastern Atlantic really belong to a single genus. However, in the Paris Museum I had the opportunity of examining specimens of three of them : *T. armatus* Blkr, *T. collignoni* Roux, *T. pellegrini* Cad. The first of these species is really a *Trachinus,* very close to *T. draco,* with which it was synonymized by Fowler (1936) : if they are identical, the habitat of *T. draco* is extended to Angola. I was not able to carefully study the other two species quoted above. Their generic position should be considered in a future revision of the whole family.

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REFERENCES

BAUCHOT M.L. et PRAS A., 1980.– Guide des poissons marins d'Europe. Ed. Delachaux-Niestlé, Lausanne, Paris, 427 p.

BLEEKER P., 1861.– Notice sur le genre *Trachinus* (Artedi) et ses espèces. *Ann. Sci. Nat.,* (4) zool., 16 : 375-382.

FOWLER H.W., 1936.– The Marine Fishes of West Africa. *Bull. Amer. Mus. Nat. Hist.,* 70 (2) : 607-1493.

GREGORY W.K., 1951.– Evolution emerging. The Macmillan Company, New York, II : 1013-24, 14 fig.

GREGORY W.K., 1959.– Fish skulls : a study of the evolution of natural mechanisms. Eric Lundberg Laurel, Florida VII, 75-481, 302 fig.

MONOD Th., 1968.– Le complexe urophore des poissons téléostéens. *Mém. Inst. Fr. Afr. noire,* Dakar, 81 : 1-705, 989 fig.

TORTONESE E., 1975.– Fauna d'Italia Osteichthyes. Ed. Calderini, Bologna XI : XVIII + 636, 240 fig.

WHEELER A., 1973.– Trachinidae. In J.C. Hureau & Th. Monod (ed), Check-List of the fishes of the north-eastern Atlantic and of the Mediterranean. Ed. Unesco, Paris : 449-450.

WHEELER A., 1978.– Key to the fishes of northern Europe. Ed. Warhe, London : XIX + 380, many fig.